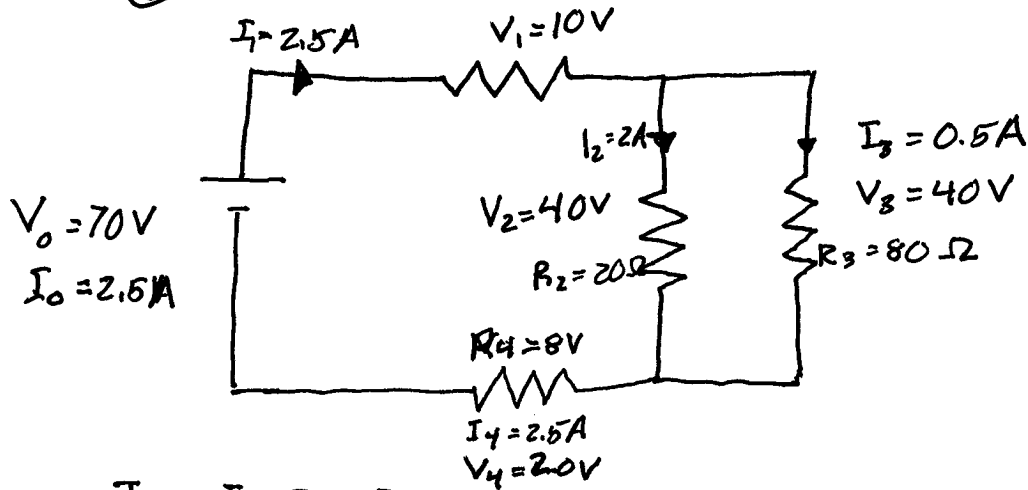


⑥



$$I_3 = \frac{V_3}{R_3} = \frac{40}{80} = 0.5$$

$$I_0 = I_1 = I_P = I_3$$

$$I_P = I_2 + I_3 = 2.5A$$

$$I_0 = I_1 = I_P = I_3 = 2.5A$$

$$V_2 = I_2 R_2 = 2 \times 20 = 40V$$

$$V_P = V_2 = V_3 = 40V$$

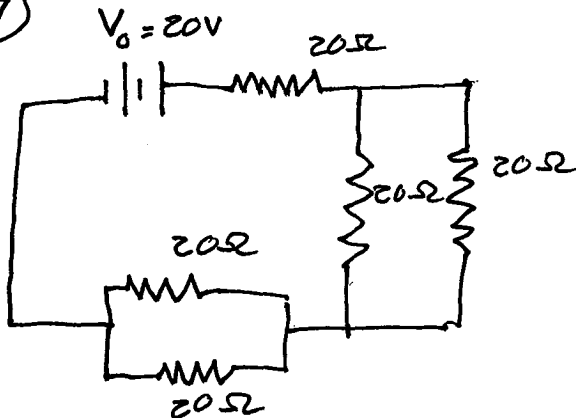
$$V_0 = V_1 + V_P + V_4$$

$$70V = 10V + 40V + V_4$$

$$V_4 = 20V$$

$$R_4 = \frac{V}{I} = \frac{20V}{2.5} = 8V$$

⑦



$$a) R_0 = R_1 + \left(\frac{1}{R_2} + \frac{1}{R_3} \right)^{-1} + \left(\frac{1}{R_4} + \frac{1}{R_5} \right)^{-1}$$

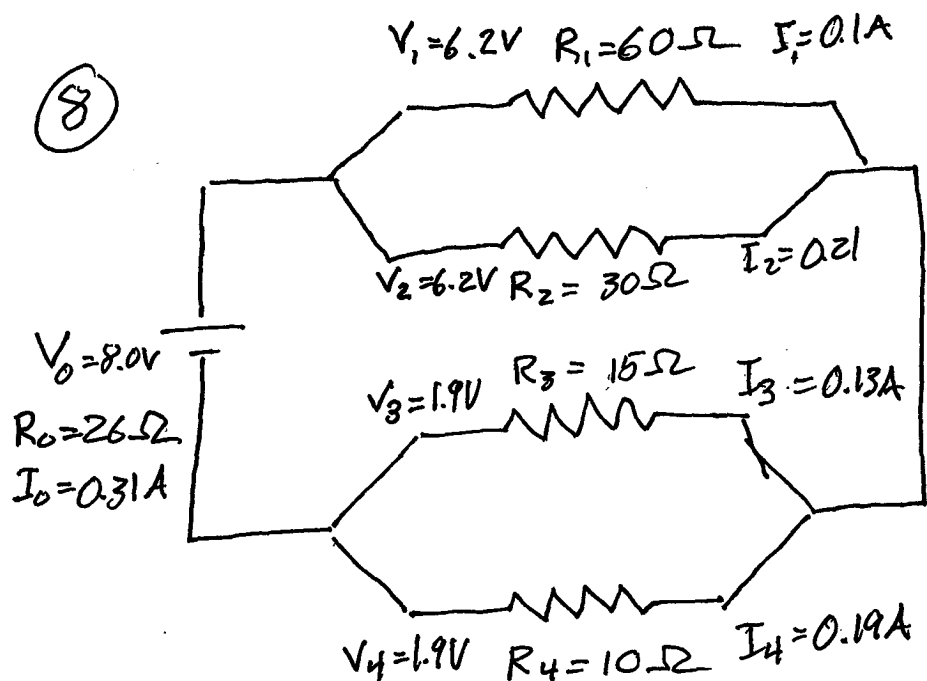
$$= 20 + \left(\frac{1}{20} + \frac{1}{20} \right)^{-1} + \left(\frac{1}{20} + \frac{1}{20} \right)^{-1}$$

$$= \underline{40\Omega}$$

$$b) I_0 = \frac{V_0}{R_0} = \frac{20V}{40\Omega}$$

$$= \underline{0.50A}$$

8



$$R_{P1} = \left(\frac{1}{30} + \frac{1}{30} \right)^{-1} = 20\Omega$$

$$R_{P2} = \left(\frac{1}{15} + \frac{1}{10} \right)^{-1} = 6\Omega$$

$$R_0 = R_{P1} + R_{P2} = 26\Omega$$

$$I_0 = \frac{V_0}{R_0} = \frac{8.0}{26} = 0.31A$$

$$I_0 = I_{P1} + I_{P2}$$

$$V_{P1} = I_{P1} R_{P1} = 0.31 \times 20\Omega = 6.2V$$

$$V_{P1} = V_1 = V_2$$

$$I_1 = \frac{V_1}{R_1} = \frac{6.2}{60} = 0.10A$$

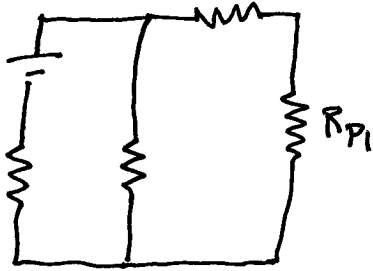
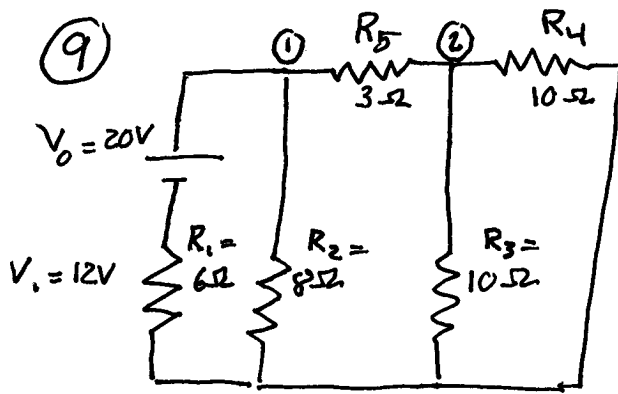
$$I_2 = \frac{V_2}{R_2} = \frac{6.2}{30} = 0.21$$

$$V_{P2} = I_{P2} R_{P2} = 0.31 \times 6 = 1.86V$$

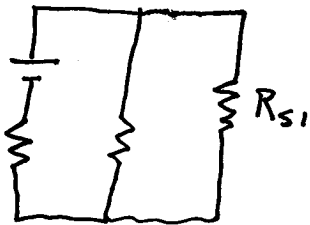
$$V_{P2} = V_3 = V_4$$

$$I_3 = \frac{V_3}{R_3} = \frac{1.9}{15} = 0.13A$$

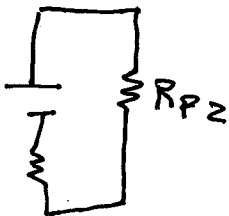
$$I_4 = \frac{V_4}{R_4} = \frac{1.9}{10} = 0.19A$$



$$R_{P1} = \left(\frac{1}{10} + \frac{1}{10} \right)^{-1} = 5\Omega$$



$$R_{S1} = 3 + 5 = 8\Omega$$



$$R_{P2} = \left(\frac{1}{8} + \frac{1}{8} \right)^{-1} = 4\Omega$$

a) $R_0 = 6\Omega + 4\Omega = \underline{10\Omega}$

b) $I_0 = \frac{V_0}{R_0} = \frac{20V}{10\Omega} = \underline{2.0A}$

c) $I_3 = ?$ $I_4 = ?$

2.0A in whole circuit
 at ① there are two paths both with 8Ω
 \therefore the current splits equally.

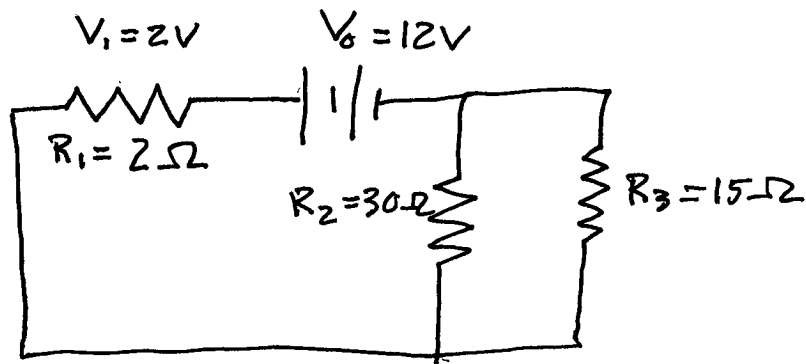
1A approached ② both paths have 10Ω so the current splits.

$$I_{P1} = I_3 + I_4 = 1A$$

$$\underline{I_3 = 0.5A} \quad \underline{I_4 = 0.5A}$$

d) $V_5 = I_5 R_5$
 $= 1A \times 3\Omega$
 $= \underline{3V}$

10



$$\begin{aligned} a) R_0 &= R_1 + \left(\frac{1}{R_2} + \frac{1}{R_3} \right)^{-1} \\ &= 2 + \left(\frac{1}{30} + \frac{1}{15} \right)^{-1} \\ &= 12\Omega \end{aligned}$$

$$b) I_1 = \frac{V_1}{R_1} = \frac{2}{2} = 1A$$

$$\begin{aligned} c) V_0 &= V_1 + V_P \\ 12 &= 2 + V_P \\ V_P &= V_2 = V_3 = 10V \end{aligned}$$

$$\begin{aligned} d) P &= IV \quad I = \frac{V}{R} \\ P &= \frac{V^2}{R} = \frac{10^2}{30} \\ &= 3W \end{aligned}$$